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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,476	10/31/2003	Hiroyuki Yatsu	9281-4703	2714

7590 06/13/2005

Brinks Hofer Gilson & Lione
P.O. Box 10395
Chicago, IL 60610

EXAMINER

NORRIS, JEREMY C

ART UNIT	PAPER NUMBER
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2841

DATE MAILED: 06/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/699,476

Applicant(s)

HIROYUKI YATSU

Examiner

Jeremy C. Norris

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings were received on 4 April 2005. These drawings are acceptable.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,075,711 (Brown) in view of US 6,410,861 B1 (Huang).

Brown discloses, referring to figures 1-3, an electronic unit comprising: a module in which a semiconductor device (10) is attached on a bottom of a circuit board (12) and which has lands (21) provided on the bottom of the circuit board with the lands being connected to the semiconductor device; and a printed circuit board (14) on which the module is mounted, the printed circuit board having conductors having a hole (16) in a position facing the semiconductor device and having electrical conductors (24) to which

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the lands are soldered (fig. 2C), wherein solder balls (col. 4, lines 5-25) are applied on the lands and the lands and the electric conductors are soldered together with the solder balls (col. 4, lines 35-45) and the module is mounted on the printed circuit board by soldering the lands to the electrical conductors while the semiconductor device is disposed in the hole (fig 2C). Brown does not specifically state that the wall of the hole has recesses that receive the corresponding solder balls and have electrical conductors applied to the walls of the recesses [claim 1]. Instead, Brown discloses that the solder bumps (22, see col. 4, lines 5-20) are connected along the periphery of the hole without recesses (see fig. 2C). Huang teaches providing conductive recesses (30) along the periphery of an IC package mounting area for receiving solder balls (see fig. 2) to reduce the overall height of the device (see figs. 1 & 2). Therefore, it would have been obvious, to one having ordinary skill in the art, at the time of invention, to use conductive recesses along the periphery of the mounting area of the IC package in the invention of Brown as taught by Huang. The motivation for doing so would have been to reduce the profile of the device thus making it smaller and more versatile to different applications. Moreover, it would have been obvious to specifically place the recesses in the walls of the hole of the invention of Brown so as to minimize the useable board area taken up by the recesses. The motivation being to allow as much space as possible for signal routing. Moreover, it has been held that more than a mere change of form is necessary for patentability. *Span-Deck, Inc v. Fab-Con, Inc.* (CA 8, 1982) 215 USPQ 835.

Additionally, the modified invention of Brown teaches, wherein the printed circuit board includes a wiring pattern disposed between laminated layers, the wiring pattern

connected to the electrical conductors (see Brown col. 3, line 30 – col. 4, line 5) [claim 4].

Response to Arguments

Applicant's arguments filed 4 April 2005 have been fully considered but they are not persuasive. Applicant alleges, "Huang specifically describes the structure 30 as a mating support area and differentiates it from the mating electrical interconnect areas 31 (Huang, col. 2, line 52-54). Thus, the structure relied upon is a mechanical structure, whereas the electrical connections are provided by other structures". While it is true that the structure 30 has mechanical properties, Huang specifically states that the mounting structures 36, which are joined to support areas 30, may comprise active structures (col. 3, lines 25-30). The ordinarily skilled artisan would immediately recognize that active mounting structures 36 necessitate electrical connection to support area 30, thus providing electrical as well as mechanical connections. Applicant additionally alleges, "the modification of the teachings of Brown to incorporate the teachings of Huang would result in an inoperative device", citing the difference between the reflow temperatures of the solder disclosed by Huang for support with respect to the solder disclosed by Huang for electrical connection. Stating that due to this difference, if the technique taught by Huang was used to modify Brown, "Prior to the melting of the mechanical connection solder balls 30 (in actuality the connecting balls are 36), the electrical connection solder balls 21 in Brown would be melted and the IC may shift or separate from the circuit board". However, in making such an allegation, Applicant has only considered the teaching of one specific embodiment of Huang and not the general

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teaching of the reference as a whole. Huang specifically states that the solder used for the support structures (36) and the electrical connection structures (37) may comprise the same materials (see Huang col. 3, lines 10-15). Thus the alleged problem caused by the difference in reflow temperatures would not even exist because there would be no difference in reflow temperatures.

Having addressed each of Applicant's arguments, the traversal of the rejection on these grounds is deemed unsuccessful.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy C. Norris whose telephone number is 571-272-1932. The examiner can normally be reached on Monday - Friday, 9:30 am - 5:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JCSN


KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800